

# **Installation and Operating Instructions**



**Series 43**

**All-Metal Pendulum Valve**

with controller and pneumatic box

DN 250 - 400 (I.D. 10" - 16")

**M4392E01**



## WARNINGS

Failure to observe the Installation and Operating Instructions (MBA) and the technical data, use of unsuitable fittings and spare parts, improper operation or modification of the valve will invalidate our warranty.

## CAUTION

Before operating the valve, make sure that the valve opening is completely unobstructed. To avoid accidents, moving parts must not be touched.

All supplies (e.g. compressed air, electrical power) have to be disconnected for installation/removal of the valve into/from the vacuum system, or if repairs or maintenance are performed. Controllers have to be turned off before they are disconnected from or connected to the valve.

The differential pressure on the gate at opening must not exceed 1 mbar.

We strongly recommend that all-metal pendulum valves are only repaired by VAT personnel or by people trained by VAT.

For safety and cleanliness, the protective flange covers must be in place if the valve is operated outside the vacuum system.

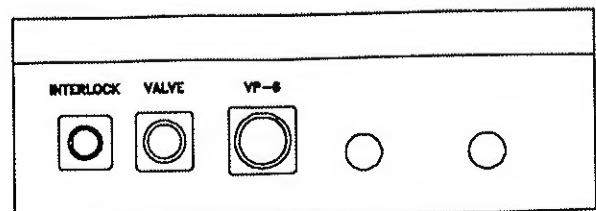
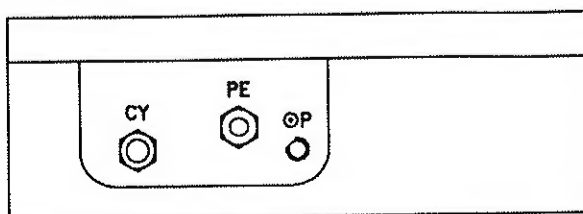
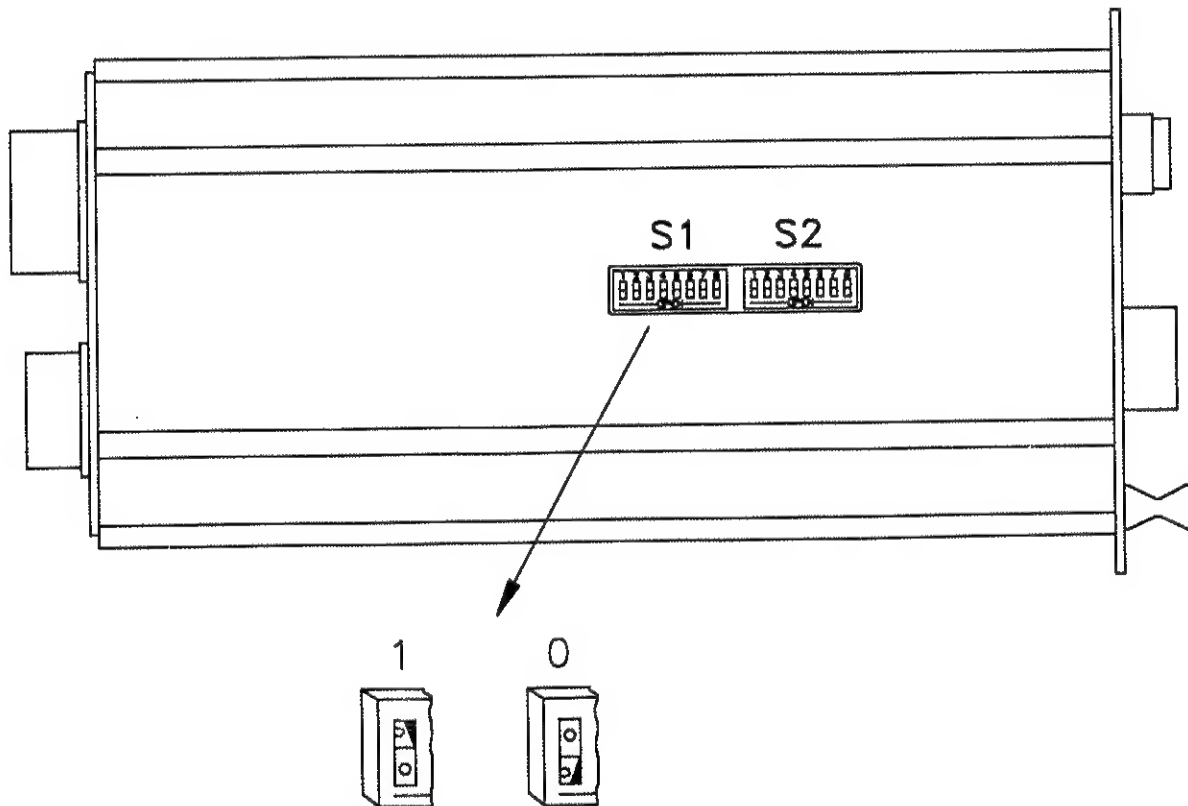
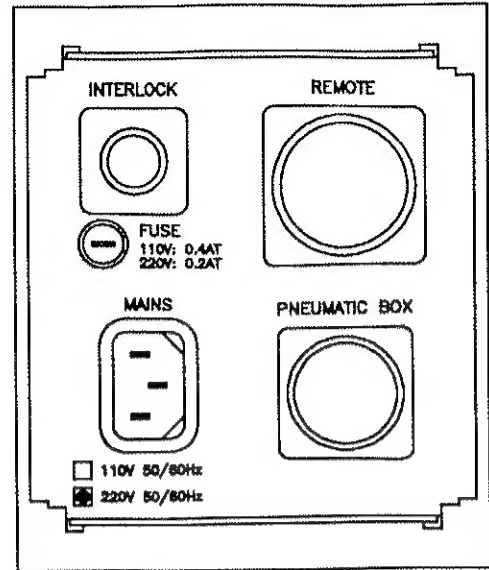
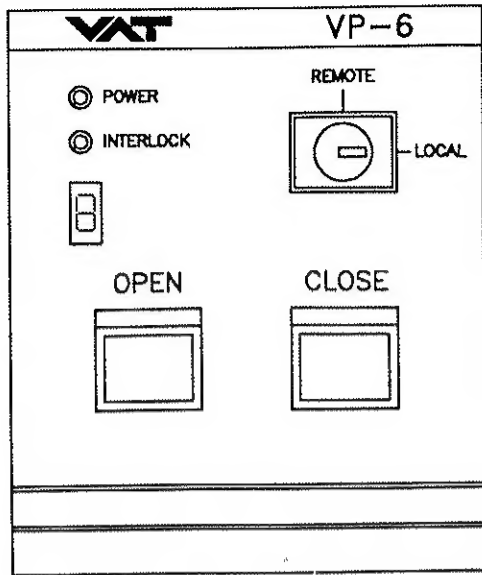
Special care has to be taken with loaded springs and/or air cushions in cylinders when dismantling the valve.

Contaminated valves (e.g. with chlorine residues) may corrode from acids that form when the residues are exposed to humidity in the air. Therefore they should be decontaminated immediately after removal from the vacuum system.

## NOTICE

In communication with VAT or its representative, the fabrication number of the valve (F43- . . . . . - . .) stamped on the A-side (seat side ▼) flange has always to be specified.

When returning valves or parts thereof to VAT for repair and/or maintenance, they must be accompanied by the filled in "**Declaration on Chemical Contamination**". The form is included on the folded cover at the back of this manual.



<b>CONTENTS</b>	<b>Page</b>
<b>1 Description</b>	<b>07</b>
1.1 Application	07
1.2 Design and function	07
1.2.1 Valve	
1.2.2 VATRING sealing configuration	
1.2.3 Controller VP-6	
1.2.4 Pneumatic box 43	
1.3 Technical data	10
1.3.1 Valve	
1.3.2 Controller VP-6	
1.3.3 Pneumatic box 43	
<b>2 Installation and start-up</b>	<b>12</b>
2.1 Installation	12
2.1.1 Handling	
2.1.2 Mounting material	
2.1.3 Admissible forces	
2.1.4 Installation into vacuum system	
2.2 Connections	14
2.2.1 Electrical connection	
2.2.2 Compressed air connection: pneumatic box - valve	
2.2.3 Mains connection to VP-6	
2.2.4 Compressed air connection to pneumatic box	
2.3 Start-up	17
2.3.1 Removal of transport protection	
2.3.2 Starting procedure	
2.3.3 Stopping procedure	
2.4 Bake-out	19
2.4.1 Bake-out of valve and actuator	
<b>3 Operation</b>	<b>20</b>
3.1 Manual operation	20
3.2 Remote control	20
3.2.1 Selection of remote control mode	
3.2.2 Wiring diagram	
3.3 Interlocks	23
3.3.1 VALVE interlock	
3.3.2 REMOTE interlock	
<b>4 Power- and/or compressed air failure</b>	<b>24</b>
4.1 Power failure	24
4.2 Power return	24
4.3 Compressed air failure	25
4.4 Compressed air return	25
<b>5 Trouble shooting</b>	<b>26</b>

<b>6</b>	<b>Service</b>	<b>27</b>
6.1	Maintenance	27
6.2	Warranty	27
6.3	Repairs	28
6.3.1	Valve: replacement of limit switches	
6.3.2	Valve: stopping procedure	
6.3.3	Valve: mounting of transport protection	
6.3.4	Controller VP-6: exchange of boards	
6.3.5	Controller VP-6: mounting of power failure option	
6.3.6	Further repairs or maintenance	
6.4	Spare parts	31
6.4.1	Ordering information	
6.4.2	Spare parts: valve	
6.4.3	Spare parts: controller VP-6	
<b>7</b>	<b>Options and accessories</b>	<b>32</b>
7.1	Options	32
7.1.1	Actuator	
7.1.2	Valve	
7.1.3	Controller VP-6	
7.2	Accessories	32
7.2.1	Valve	
7.2.2	Controller VP-6	

# 1 Description

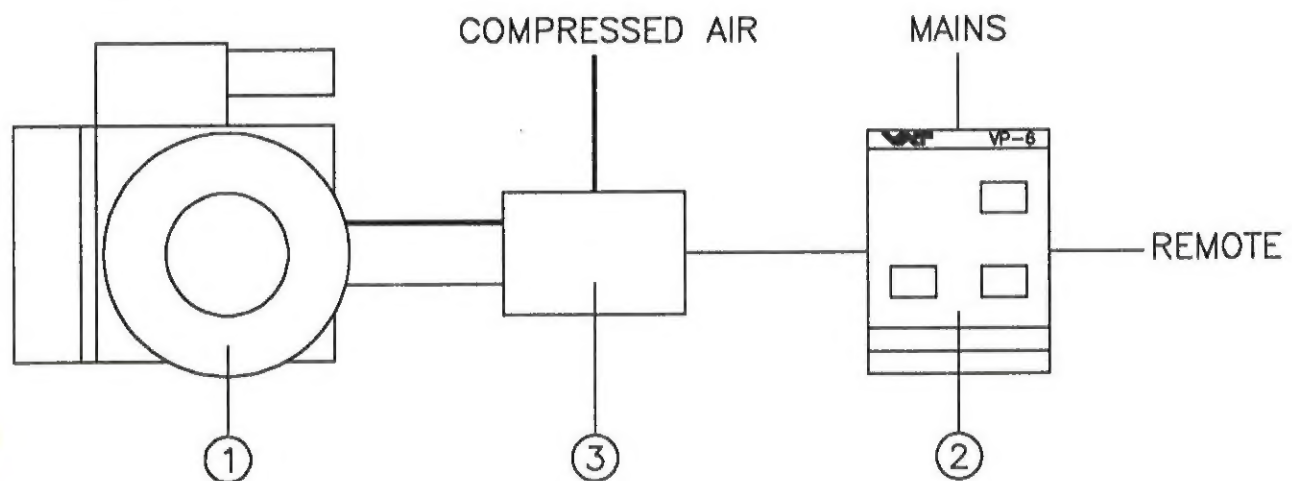
## 1.1 Application

All-metal pendulum valves are designed for extreme UHV applications with large diameters.

## 1.2 Design and function

The series 43 all-metal pendulum valve is a complete valve system consisting of the following components:

1. all-metal pendulum valve series 43
2. controller VP-6
3. pneumatic box 43



A reliable functioning of the valve is only guaranteed if controller VP-6 and pneumatic box 43 are connected as shown in the diagram.

### 1.2.1 Valve

The interior of the stainless steel body is free of trapped volumes and guarantees a low outgassing rate.

The motion feedthroughs of actuator and pressure element are separated from the valve interior by a metal bellows.

The gate seal and all static seals are made of metal.

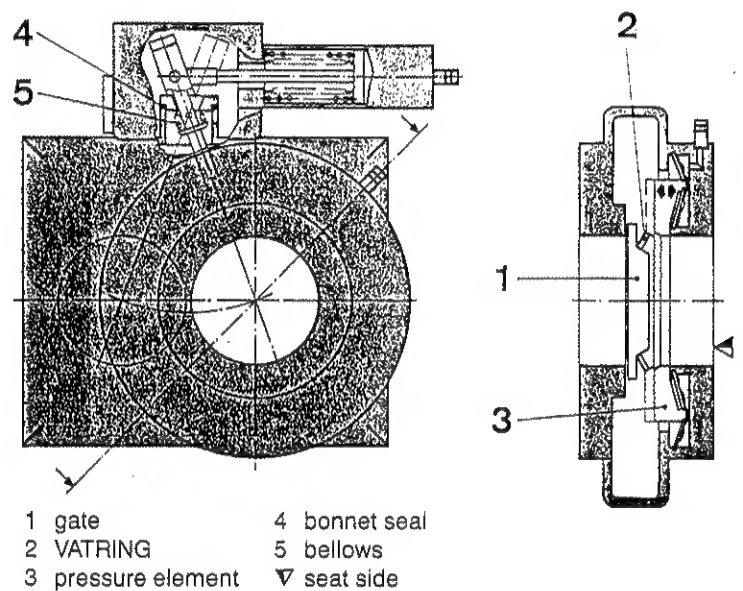
In the open position, pendulum and pressure element are kept in place by springs. The cross section is completely free in the open position.

For closing, the pendulum is swung into the closing position by the single acting pneumatic cylinder. After the pendulum reached its end position, the pressure element is moved forward by compressed air. The sealing surface is pressed against the VATRING.

During opening the movement proceeds in reverse order.

**The differential pressure on the gate at opening must not exceed 1 mbar.**

The VATRING is an all-metal sealing configuration developed and patented by VAT.



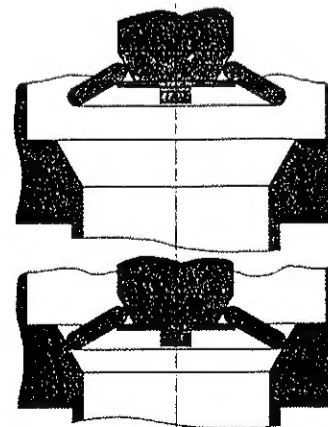
### 1.2.2 VATRING sealing configuration

All-metal sealing configuration developed and patented by VAT.

The conically arranged seal ring allows for large sealing forces with relatively small closing or axial forces.

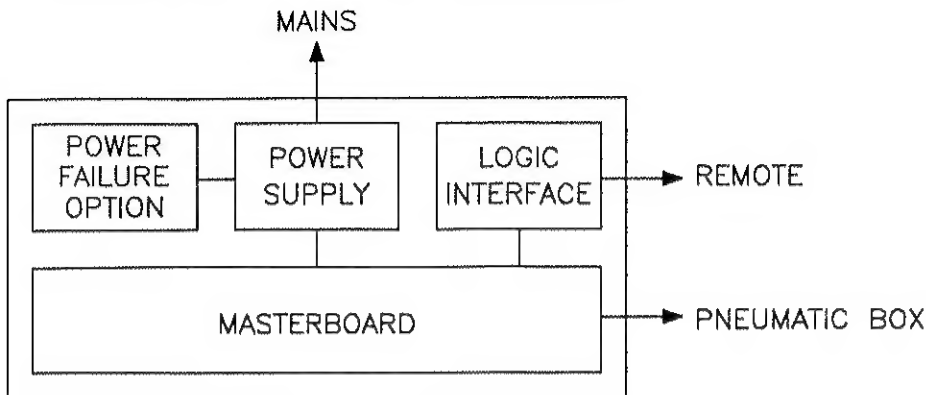
The sealing partners are stainless steels which are only elastically deformed despite the large sealing forces.

Under clean operating conditions the VATRING configuration has a very long cycle life of 100 000 cycles. It is bakeable to 450°C in the open and closed position.



### 1.2.3 Controller VP-6

The controller consists of the following components:



#### Power supply

The power supply supplies +5V and +24V to the controller and to the solenoids in the pneumatic box. Both voltages are short-circuit proof.

#### Power failure option

At power failure an accumulator supplies power to the controller for about 1 minute. During this time the controller automatically performs the preset valve movement (behaviour at power failure). The accumulator recharges automatically after power return.

#### Master board

The master board contains the 8-bit microprocessor with an EPROM as programme memory. The microprocessor continuously supervises all inputs (valve position, interface, push-buttons etc.) and is responsible for the correct control sequence during valve operation.

#### Interface

The interface enables remote control by logic signals.

### 1.2.4 Pneumatic box 43

The pneumatic box consists of the following elements:

- 2 solenoids for impulse actuation to control the pendulum and pressure element
- Pressure switch to supervise the compressed air pressure
- 2 pressure switches to determine the position of the pressure element  
(  $P < 0.5 \text{ bar} = \text{open}$ ,  $P > 6.5 \text{ bar} = \text{closed}$  )
- Check valve to keep the valve in last position at compressed air failure
- Pressure relief valve to stabilize the input pressure

## 1.3 Technical data

### 1.3.1 Valve

#### 1.3.1.1 Specification

Leak rate: body, seat	$<5 \cdot 10^{-10}$ mbar ls <sup>-1</sup>
Pressure range (internal)	UHV to 1 bar (abs)
Differential pressure on the gate	1 bar in either direction
Max. differential pressure at opening	1 mbar
Cycles until first service	2 000
Bake-out temperature	
- Valve	300°C
- Pneumatic actuator	300°C (10 <sup>8</sup> Gy)
Heating and cooling rate	
- Room temperature to 100°C:	
open	DN 250: 80°C h <sup>-1</sup> , DN 400: 60°C h <sup>-1</sup>
closed	DN 250: 50°C h <sup>-1</sup> , DN 400: 40°C h <sup>-1</sup>
with actuation	DN 250: 25°C h <sup>-1</sup> , DN 400: 20°C h <sup>-1</sup>
- 100°C to 300°C:	
open	DN 250: 10°C h <sup>-1</sup> , DN 400: 10°C h <sup>-1</sup>
closed	DN 250: 10°C h <sup>-1</sup> , DN 400: 10°C h <sup>-1</sup>
with actuation	DN 250: 10°C h <sup>-1</sup> , DN 400: 10°C h <sup>-1</sup>
Radiation resistance	
- Valve	10 <sup>8</sup> Gy (10 <sup>10</sup> rad)
- Actuator	10 <sup>8</sup> Gy (10 <sup>10</sup> rad)
Material	
- Body, mechanism	1.4306, AISI 304L
- Bellows	1.4306, AISI 304L
Seal: bonnet, gate	metal
Mounting position	DN 250: any, DN 400: on request
Standard flanges	
- DN 250	CF 250-F (I.D. 10", O.D. 12")
- DN 400	ISO 400-F (I.D. 16")
Molecular flow conductance	
- DN 250	15 000 ls <sup>-1</sup>
- DN 400	43 000 ls <sup>-1</sup>
Compressed air pressure (overpressure)	7.5 - 11 bar (110 - 150 psig)
Volume of air cylinder	
- DN 250	1.5 l (.053 ft <sup>3</sup> )
- DN 400	4.0 l (.141 ft <sup>3</sup> )
Closing / opening time	
- DN 250	13 / 20 s
- DN 400	21 / 24 s
Weight	
- DN 250	160 kg (352 lbs)
- DN 400	475 kg (1045 lbs)

#### 1.3.1.2 Dimensions

See dimensional drawing on page 33

**1.3.2 Controller VP-6**Mains connection

Mains voltage	110V, 220V +/- 25% (selectable)
Mains frequency	50/60Hz
Power required	max. 30 W
Fuse	110V: 0.4A slow, 220V: 0.2A slow
Behaviour at power failure	
- without power failure option	no change
- with power failure option	selectable: - no change - valve closes - valve opens
Behaviour at power return	selectable: - no change - valve closes - valve opens

Logic interface

Digital inputs	selectable: - potential free relay contacts - 24V +/- 20% DC or 50/60Hz
Digital outputs	potential free relay contacts max. 50V / 0.5A ohmic load
Pulse duration at impulse actuation	min. 0.5 sec

Interlocks

REMOTE interlock	selectable: - opening and closing blocked - only closing blocked - only opening blocked - interlock function switched-off
VALVE interlock	selectable: - opening and closing blocked - only closing blocked - only opening blocked - interlock function switched-off

General data

Ambient temperature	0 - 50°C
Length of cable: controller - pneumatic box	max. 250 m (820 ft)
Dimensions (W x H x D)	106.3 x 128.4 x 230 mm (4.2 x 5.1 x 9.1") ¼ of 19" rack insert, 3 height units
Weight	2.5 kg (5.5 lbs)

**1.3.3 Pneumatic box 43**

Compressed air pressure (overpressure)	7.5 - 11 bar (110 - 150 psig)
Compressed air connection	R 1/8"
Ambient temperature	0 - 50°C
Radiation resistance	10 <sup>5</sup> Gy (10 <sup>7</sup> rad)
Length of cable: pneumatic box - valve	max. 20 m (66 ft)
Dimensions (W x H x D)	160 x 91 x 260 mm (6.3 x 3.6 x 10.2")
Weight	4.9 kg (10.8 lbs)

## 2 Installation and start-up

It is essential to read the Installation and Operating Instructions (MBA) carefully before the valve is unpacked, installed into the system and operated.

**Non-observance of our instructions can damage the valve and the controller.**

**Attention:** The controller must be disconnected from the mains for removal of the covers

**Notice:** Factory preset conditions of the switches are marked by "S"

### 2.1 Installation

#### 2.1.1 Handling

The valve is delivered with plate in closed position, with transport protection and protection flanges in place. It should only be transported in this way. The plastic packing and transport protections may only be removed immediately before the valve is mounted into the system. See section 2.3.1 for removal of transport protection. After removing the transport protection, no shock must be applied to the valve and special care is required for unprotected sealing surfaces. The valve must not be placed on its unprotected mating flanges.

Handling of the valve must take place under clean conditions normally observed in good vacuum practice.

The valve must be carried or lifted on the 4 supporting points.

The valve, especially external and internal sealing surfaces, may only be touched with clean, lint-free gloves.

The valve may only be installed into a clean system.

For safety and cleanliness, the protective flange covers must be in place if the valve is operated outside the vacuum system. To avoid accidents, moving parts must not be touched.

#### 2.1.2 Mounting materials

The valve is supported using threaded holes - M12 for DN 250, M24 for DN 400 - on the valve body.

The following mounting material is required for standard valves:

DN 250:

- 2 gaskets for CF 250 flanges
- 64 screws M8. The thread in the flange of the valve is 18 mm deep.

DN 400:

- 2 gaskets for ISO 400 flanges
- 96 screws M12. The thread in the flange of the valve is 24 mm deep.

Consult VAT catalogue for valve fittings, bolt sets, seals etc.

See section 6.4 "Spare parts" for cables and compressed air lines.

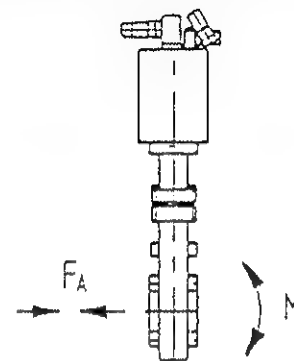
### 2.1.3 Admissible forces

The valve must not be used to support other components of the installation.

Forces from evacuating the system, from the weight of other components, and from baking can lead to deformations of the valve body and to malfunction of the valve. The stress has to be relieved by suitable means, e.g. bellows sections. The following forces are admissible:

DN	I.D.	Axial tensile or compressive force $F_A^{1)}$		Bending moment $M^{1)}$	
		N	lbf	Nm	lbf · ft
250	10	1000	225	100	70
400	16	5000	1125	500	340

<sup>1)</sup> If a combination of both forces " $F_A$ " and " $M$ " occurs, the values mentioned above are invalid. Please contact VAT for more information.



### 2.1.4 Installation into vacuum system

Open the valve by means of the series 43 control units and disconnect the valve from the Pneumatic Box 43

Clean the sealing surfaces of all flanges with alcohol and install the valve into the system.

DN 250 valves may be mounted in any position, DN 400 valves should be mounted in the specified position.

The bolt threads outside the vacuum must be lubricated with a heat resistant grease (e.g. Molykote spray 321 R or equivalent).

The screws of the flanges have to be tightened uniformly in crosswise order.

The valve seat side is marked by the symbol ▼ on the connection flange.

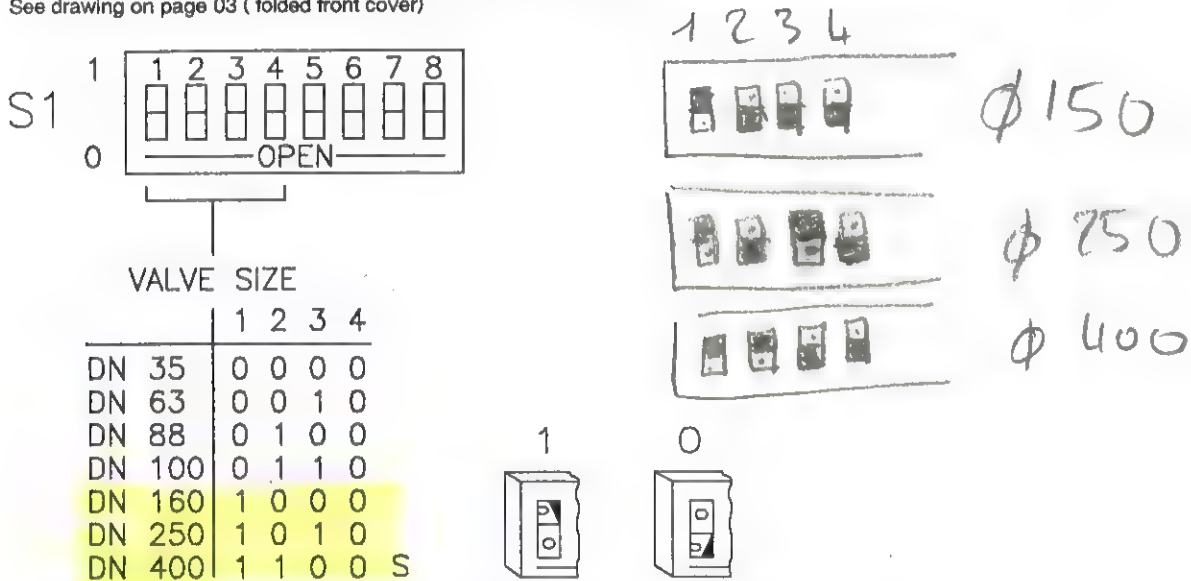
After the valve has been installed, we recommend to test the whole system with helium for vacuum integrity.

## 2.2 Connections

### 2.2.1 Electrical connection

#### 2.2.1.1 Valve size adjustment

To ensure optimum control the valve size has to be adjusted to the controller by switch S1  
See drawing on page 03 ( folded front cover)

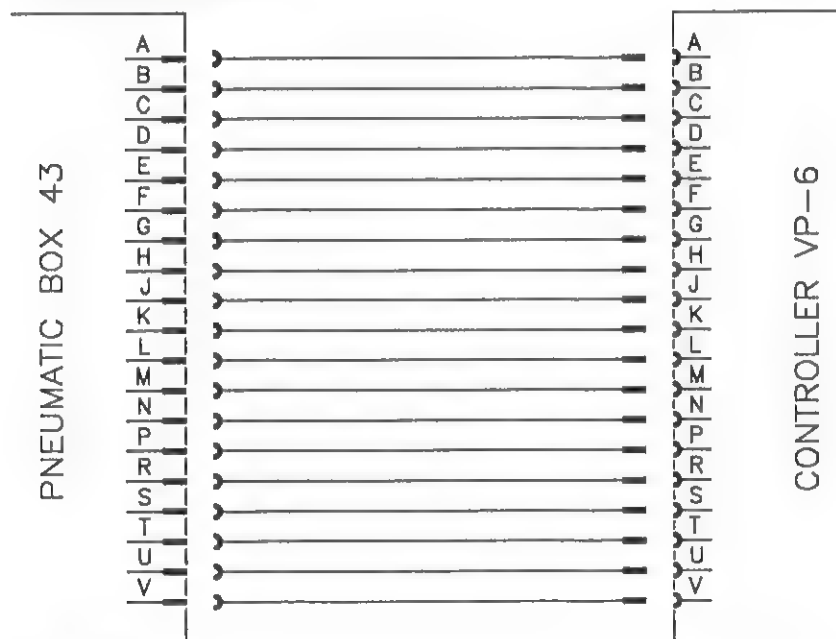


If valve and controller are supplied together the adjustment is performed by VAT.

#### 2.2.1.2 Connection: controller - pneumatic box

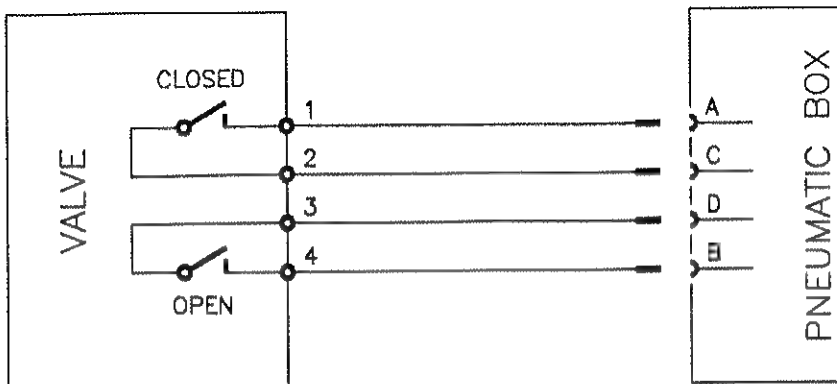
Connect controller/connector PNEUMATIC BOX and pneumatic box/connector VP-6 by means of the supplied cable.

Pin layout of the plugs:



### 2.2.1.3 Connection: pneumatic box - valve

Connect pneumatic box/connector VALVE and valve/screw terminal by means of the supplied cable according to the following drawing:



### 2.2.2 Compressed air connection: pneumatic box - valve

Connect compressed air by means of the two supplied flexible metal lines:

- line diam. 8 mm to pneumatic box/connection PE and to pressure element of valve
- line diam. 10 mm to pneumatic box/connection CY and to pneumatic cylinder of valve

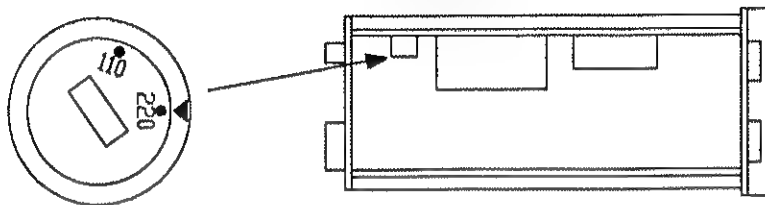
Leak tightness of these connections is essential to ensure the selected behaviour of the valve at compressed air failure.

### 2.2.3 Mains connection to VP-6

#### 2.2.3.1 Mains voltage setting

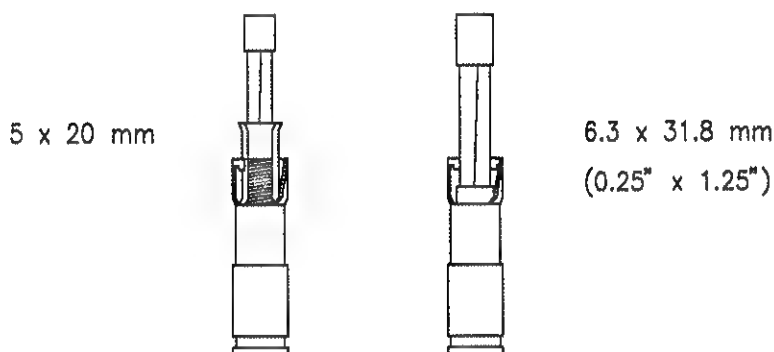
The controller is set by VAT according to your order (110V or 220V).

The mains voltage can be set inside the controller by a switch which is accessible after removal of the upper cover.



When changing the mains voltage, the fuse located at the rear side of the controller has also to be exchanged (110V: 0.4 AT, 220V: 0.2 AT).

VAT uses the fuse size 5 x 20 mm with the appropriate socket. The socket for the fuse size 6.3 x 31.8 (0.25" x 1.25") is included.



After changing the mains voltage, the label on the rear side of the controller has to be rectified accordingly.

#### 2.2.3.2 Mains connection

Connect the controller to mains by means of the supplied connector.

Contacts: L = line  
N = neutral  
↓ = protective earth

For safety reasons it is essential to connect the protective earth.

### 2.2.4 Compressed air connection to pneumatic box

Connect compressed air to pneumatic box/connection ♂ P (thread R 1/8").

Install a filter with water separator to ensure that the compressed air is clean and dry, and flush and clean the compressed air line before connection, if necessary.

## 2.3 Start-up

### 2.3.1 Removal of transport protection

Valves series 43 are delivered with a transport protection to prevent damages due to shocks during transportation.

**Attention: The valve will be damaged if the transport protection is not removed according to the correct procedure!**

The transport protection consists of:

- Black screw at the actuator to maintain pendulum in the closed position
- Aluminum cover with O-ring on the A-side (seat side▼)  
This cover is spring loaded to press the pendulum away from the seat during transport
- Aluminum cover with O-ring on the B-side

The transport protection may only be removed in a clean area. Take care that no dust or dirt particles enter the valve interior. Please proceed exactly in the way described below:

1. Put valve on table with seat side upwards
2. Remove aluminum cover from A-side flange (seat side) (cover is spring loaded!)
3. Perform all electrical connections according to item 2.2.1
4. Perform compressed air connections between valve and pneumatic box according to item 2.2.2
5. Connect controller to mains according to item 2.2.3.2 (switch-on mains)
6. A flashing "U" should be displayed by the controller
7. If a flashing "U" is displayed, connect compressed air to pneumatic box according to item 2.2.4
8. Set key-switch at controller to LOCAL and press push-button CLOSE
9. The push-button CLOSE first flashes (valve closes) and then lights continuously (valve is closed)
10. Remove black locking screw from valve actuator
11. Wrap up black locking screw into a plastig bag and store it in the pneumatic box
12. Press push-button OPEN at controller
13. The valve opens; wait until push-button OPEN lights continuously
14. Remove compressed air lines between valve and pneumatic box
15. Remove compressed air connection from pneumatic box
16. Press push-button CLOSE at controller and wait until the push-button OPEN lights up continuously again
17. Disconnect controller from mains
18. Disconnect all electrical connections
19. Mount protective cover (without springs) to valve, if necessary

### 2.3.2 Starting procedure

Please proceed exactly in the way described below:

**Non-observance of the following sequence can damage the valve!**

1. Perform all electrical connections according to item 2.2.1
2. Perform compressed air connections between valve and pneumatic box according to item 2.2.2
3. Connect controller to mains according to item 2.2.3.2 (switch-on mains)
4. A flashing "U" should be displayed by the controller
5. If a flashing "U" is displayed, connect compressed air to pneumatic box according to 2.2.4
6. After connecting the compressed air the push-button OPEN lights up and the flashing "U" extinguishes
7. Close the valve by pressing the push-button CLOSE
8. Check leaktightness of all compressed air connections with a leak detector spray

Valve is ready for operation

### 2.3.3 Stopping procedure

Please proceed exactly in the way described below:

**Non-observance of the following sequence can damage the valve!**

1. Open the valve (push-button OPEN lights continuously)
2. Remove compressed air lines between valve and pneumatic box
3. Remove compressed air connection from pneumatic box
4. Press push-button CLOSE at controller and wait until the push-button OPEN lights up continuously again
5. Disconnect controller from mains
6. Disconnect electrical connection

## 2.4 Bake-out

### 2.4.1 Bake-out of valve and actuator

The complete all-metal pendulum valve including the actuator can be baked to 300°C in open or closed position.

The heating and cooling rates are given in section 1.3.1 and must not be exceeded.

The bake-out oven must ensure a small temperature variation (max. 30°C) throughout the valve. VAT's flexible bake-out jackets are recommended (see section 7.2 or VAT catalogue).

The VAT bake-out control unit series 84 is recommended for a well controlled bake-out procedure (see section 7.2 or VAT catalogue).

#### Attention!

- To avoid oxidation of the interior surfaces, the pressure inside the valve must not exceed  $1 \cdot 10^{-5}$  mbar.
- Hard copper oxide particles of the copper seals of the flanges can damage the sealing surfaces. Special care has to be taken when dismantling a baked valve from the vacuum system. We recommend silver plated gaskets for baking temperatures exceeding 250°C.
- The valve must not be actuated during heating and cooling, but only after the bake-out temperature has been stable for at least two hours.
- If the valve has to be actuated during heating and cooling or before the bake-out temperature has been stable for two hours, the heating and cooling rates have to be reduced: See section "Technical data" 1.3.1.1 for specifications.

## 3 Operation

### 3.1 Manual operation

For manual operation the key switch has to be set to LOCAL. Remote control is no longer possible.

Operate the valve by briefly pressing the push-button OPEN or CLOSE. The push-button flashes as long as the valve is moving and lights continuously when the end position is reached.

### 3.2 Remote control

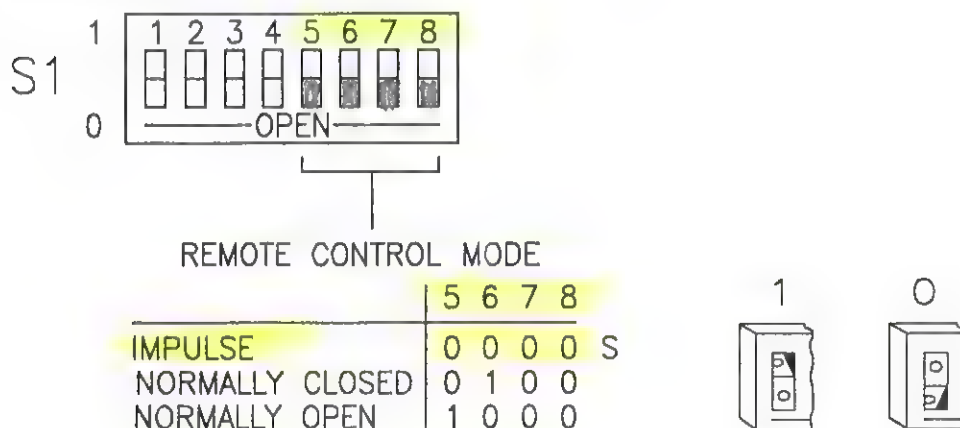
For remote control the key switch has to be set to REMOTE. Manual operation is no longer possible.

#### 3.2.1 Selection of remote control mode

Three remote control modes are possible:

- impulse actuation by two inputs:  
a brief pulse to input OPEN opens the valve  
a brief pulse to input CLOSE closes the valve
- continuous signal control, normally closed (NC):  
signal applied: valve opens  
signal not applied: valve closes
- continuous signal control, normally open (NO):  
signal applied: valve closes  
signal not applied: valve opens

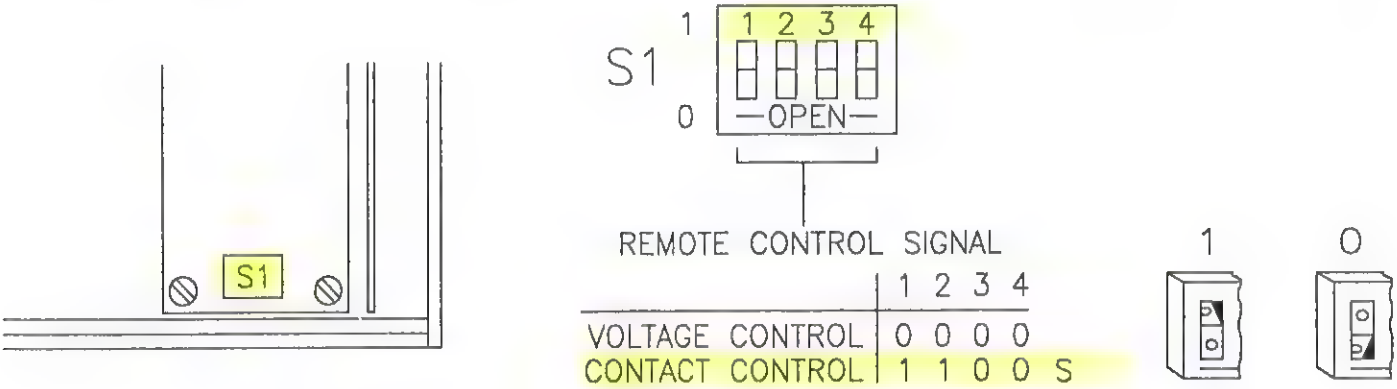
The desired remote control mode is set by switch S1  
See drawing on page 03 (folded front cover)



Remote control is possible by:

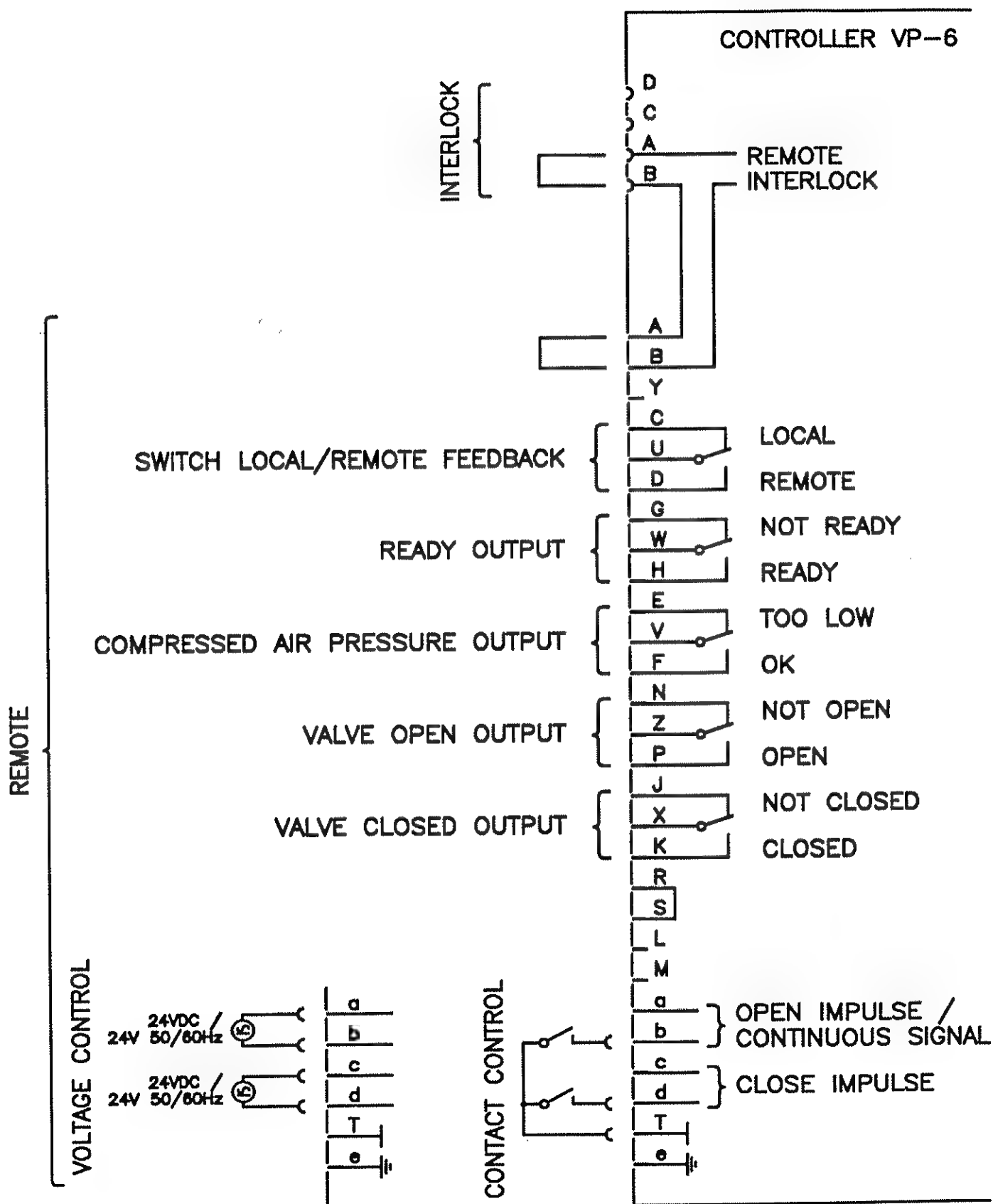
- potential free relay contacts (contact control)
- 24V DC or 24V 50/60Hz (voltage control)

The desired mode has to be set on the logic interface by the switch S1 which is accessible after removal of the bottom cover.



## 3.2.2 Wiring diagram

The wiring has to be performed at the connector REMOTE on the rear side of the controller.



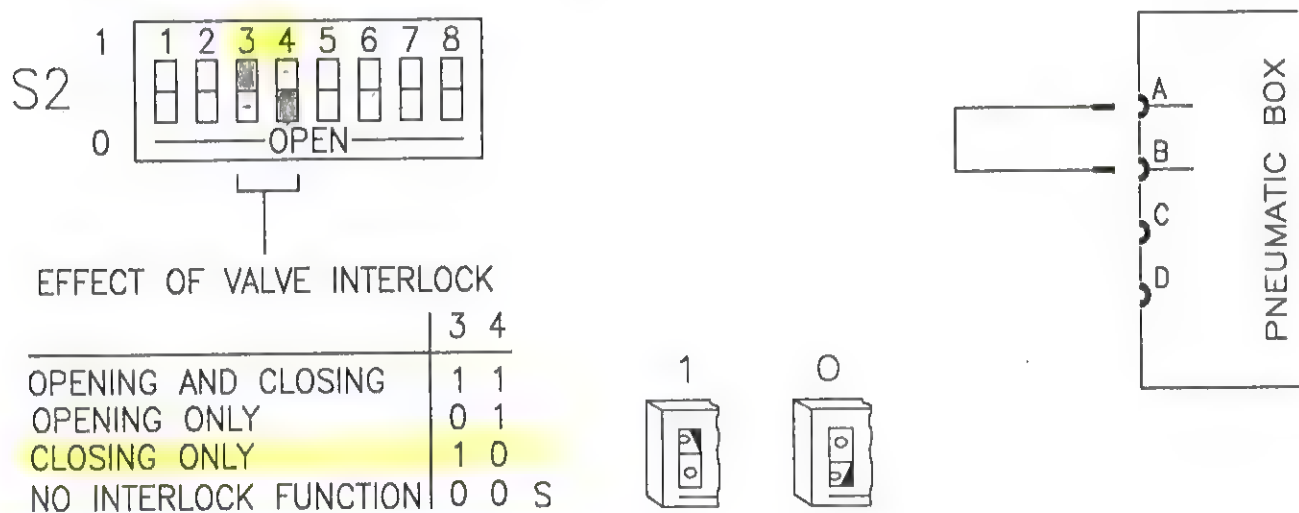
### 3.3 Interlocks

Operation of the valve can be blocked by interrupting the connected interlock loops. Two interlock loops can be connected.

- VALVE interlock: connection to pneumatic box (connector INTERLOCK)
- REMOTE interlock: connection to controller (connector INTERLOCK and REMOTE)

#### 3.3.1 VALVE interlock

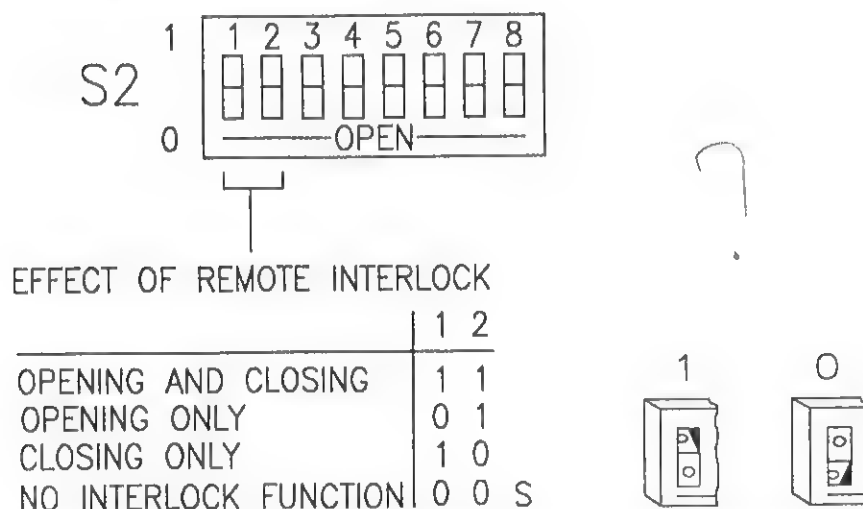
The functions that shall be blocked by interrupting the VALVE interlock loop have to be set by the switch S2  
See drawing on page 03 (folded front cover)



#### 3.3.2 REMOTE interlock

The functions that shall be blocked by interrupting the REMOTE interlock loop have to be set by the switch S2  
See drawing on page 03 (folded front cover)

Wiring diagram: see item 3.2.2



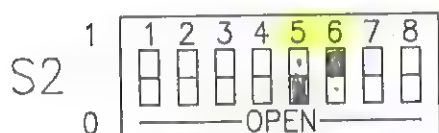
## 4 Power- and/or compressed air failure

### 4.1 Power failure

- No power failure option installed:  
The valve remains in last position

- Power failure option installed:  
The controller automatically switches to the internal accumulator which supplies power to the controller for 1 minute. During this time the controller performs the preset behaviour at power failure. The desired behaviour can be set by the switch S2

See drawing on page 03 ( folded front cover)



BEHAVIOUR AT POWER FAILURE

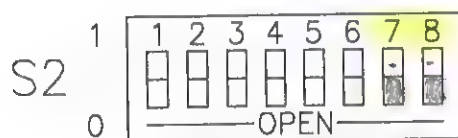
	5	6	
NO CHANGE	0	0	S
VALVE CLOSES	0	1	
VALVE OPENS	1	0	



### 4.2 Power return

The desired behaviour can be set by the switch S2

See drawing on page 03 ( folded front cover)



BEHAVIOUR AT POWER RETURN

	7	8	
NO CHANGE	0	0	S
VALVE CLOSES	0	1	
VALVE OPENS	1	0	



### 4.3 Compressed air failure

- Valve open: valve remains open
- Valve closed: valve remains closed and leaktight for at least 6 hours  
(valve can be opened without compressed air)

### 4.4 Compressed air return

- Valve open: valve remains open
- Valve closed: valve remains closed

## 5 Trouble shooting

Many errors can be identified by the controller itself. They are displayed as follows:

All displays inactive	- Mains voltage not properly set	2.2.3
	- Fuse at rear side of controller defective	2.2.3
Flashing "A" after switching-on	- EPROM has to be replaced	
Flashing "U" after switching-on	- Compressed air not connected	2.2.4
Flashing "E" after switching-on	- Wrong start-up	2.3.2
Controller does not react to push-buttons	- Set key switch to LOCAL	3.1
	- VALVE or REMOTE interlock loop interrupted	3.3
LED INTERLOCK and flashing "r"	- REMOTE interlock loop interrupted	3.3
LED INTERLOCK and flashing "v"	- VALVE interlock loop interrupted	3.3
Flashing "P"	- Compressed air pressure < 7 bar	
Flashing "O"	- Limit switch for open pendulum position defective	6.3.1
Flashing "C"	- Limit switch for closed pendulum position defective	6.3.1
Flashing "L"	- Pressure switch for open position of pressure element defective (pneumatic box)	
Flashing "H"	- Pressure switch for closed position of pressure element defective (pneumatic box)	
Flashing "d"	- Pendulum does not move	
Flashing "n"	- Pressure element does not move	
Flashing "F"	- Short-circuit of a solenoid coil	
Flashing "power"	- Power failure; internal accumulator supplies power to the controller	4.1

## 6 Service

### 6.1 Maintenance

Under clean operating conditions the valve will work properly without maintenance during the specified cycle life.

Maintenance or repairs of the valve should only be performed by VAT personnel or by people trained by VAT.

### 6.2 Warranty

VAT warrants to Customer that all new and unused goods furnished by Seller shall be free from defect in workmanship and material for a period of 12 months from the date of delivery. VAT DISCLAIMS all other express warranties and all implied warranties as to the quality of any goods, including implied warranties of MERCHANTABILITY and FITNESS FOR PARTICULAR PURPOSES. In case of VAT's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore are, at VAT's option, (1) repair, (2) replacement, or (3) in appropriate cases, payment of or credit for the purchase price (less reasonable depreciation) on authorized return of the goods. Any such claim against VAT must be made in writing and promptly pursued within 13 months from the date of delivery of the goods.

This warranty does not cover damages due to normal wear, incorrect maintenance, disregard of operating instructions, inappropriate working conditions, improper materials, chemical or electrolytical influences, faulty installation or other cases beyond the control of VAT. Modifications or repairs made by the Customer without VAT's written consent render this warranty inoperable. Customer is required to inspect delivered goods promptly upon receipt and provide VAT with written notice of defects within 10 days of Customer's discovery in connection with such inspection.

## 6.3 Repairs

Please contact VAT or its representative for repairs or maintenance. The fabrication number of the valve (F43- . . . . . - . . .) stamped on the A-side (seat side) flange has always to be specified.

It has to be individually decided whether the work can be performed by the customer or has to be carried out by VAT.

### Important notice regarding valves being returned to VAT

When returning valves or parts thereof to VAT for repair or maintenance, they must be accompanied by a signed declaration that the product has not been exposed to any hazardous contamination or that appropriate decontamination procedures have been carried out so that the product is safe to handle. This declaration has to be securely fastened to the **outside of the packaging**. We regret that we cannot perform any repair or maintenance if the declaration is missing.

A suitable form "**Declaration on Chemical Contamination**" is included on the folded page at the back of this manual, or can be obtained from VAT.

As additional security, and to speed-up your repair, please send a **duplicate declaration by post or fax**.

**Returned valves must be shipped in closed position with protective flanges and transport protection in place, and adequately packed.** Please proceed as described in sections 6.3.2 and 6.3.3 to ready the valve for shipment.

For repairs and/or maintenance, the following instructions have to be observed strictly.

Before operating the valve, make sure that the valve opening is completely unobstructed. To avoid accidents, moving parts must not be touched.

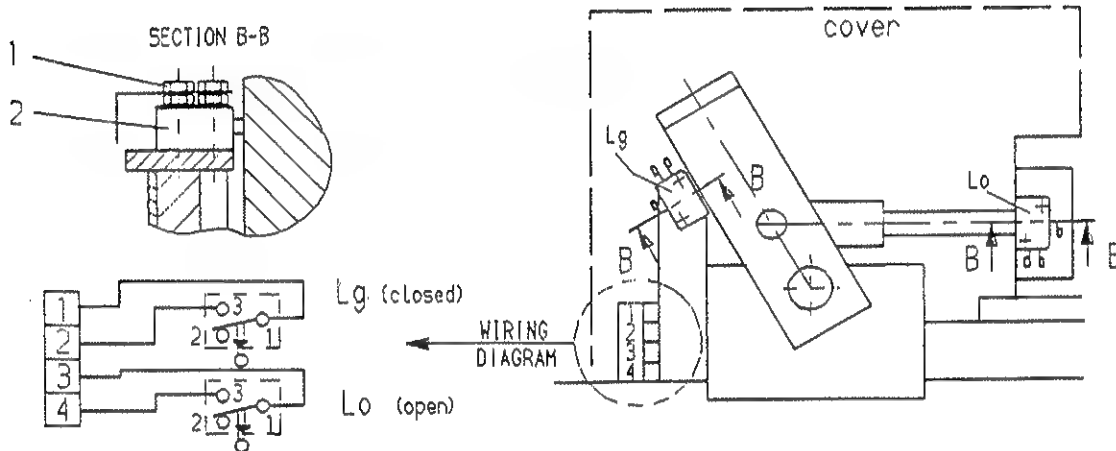
All supplies (e.g. compressed air, electrical power) have to be disconnected for installation/removal of the valve into/from the vacuum system. Controllers have to be turned off before they are disconnected from or connected to the valve.

For safety and cleanliness, the protective flange covers must be in place if the valve is operated outside the vacuum system.

Even with disconnected supply, loaded springs and/or air cushions in cylinders can be potential hazards.

### 6.3.1 Valve: replacement of limit switches

1. Remove cover (1)
2. Remove limit switches (2)
3. Exchange and adjust limit switches
4. Connect limit switches according to wiring diagram
5. Mount cover



### 6.3.2 Valve: stopping procedure

Please proceed exactly in the way described below:

**Non-observance of the following sequence can damage the valve!**

1. Open the valve (push-button OPEN lights continuously)
2. Remove compressed air lines between valve and pneumatic box
3. Remove compressed air connection from pneumatic box
4. Press push-button CLOSE at controller
5. Disconnect controller from mains
6. Disconnect electrical connections

The valve can now be removed from the installation.

### 6.3.3 Valve: mounting of transport protection

Please proceed exactly in the way described below:

**Non-observance of the following sequence can damage the valve!**

1. Start-up of valve and controller according to item 2.3
2. Close the valve (push-button CLOSE lights continuously)
3. Mount black locking screw to valve actuator
4. Press push-button OPEN
5. Wait until controller displays the flashing "d"
6. Remove compressed air lines between valve and pneumatic box
7. Remove compressed air connection from pneumatic box
8. Press push-button CLOSE at controller and wait until the flashing "d" is displayed
9. Disconnect controller from mains
10. Disconnect electrical connections
11. Mount aluminum protective cover with spring on valve seat side
12. Mount aluminum protective cover on opposite side

### 6.3.4 Controller VP-6: exchange of boards

Please proceed exactly in the way described below:

1. Disconnect controller from mains
2. Remove upper and bottom cover
3. Remove rear panel
4. Remove all plug connections and withdraw board backwards

### 6.3.5 Controller VP-6: mounting of power failure option

Please proceed exactly in the way described below:

1. Disconnect controller from mains
2. Remove upper and bottom cover
3. Mount power failure option instead of upper cover
4. Connect cable of power failure option to power supply board
5. Mount bottom cover

### 6.3.6 Further repairs or maintenance

Repairs or maintenance other than those described in section 6.3 must only be performed by VAT personnel or by people trained by VAT. In any case, VAT or its representative should be contacted.

## 6.4. Spare parts

### 6.4.1 Ordering information

Orders of spare parts must include the following information:

1. Fabrication number of valve (e.g. F43- . . . . . - . .)
2. Type and nominal diameter of valve (e.g. All-Metal Pendulum Valve Series 43, DN250)

### 6.4.2 Spare parts: valve

Micro switch for position indicator	Ordering No. N-8406-071
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### 6.4.3 Spare parts: controller VP-6

Master board (see item 1.2.3)	Ordering No. 69624
-------------------------------	--------------------

Power supply (see item 1.2.3)	Ordering No. 69621
-------------------------------	--------------------

Logic Interface (see item 1.2.3)	Ordering No. 69627
----------------------------------	--------------------

Connection cable: controller - pneumatic box	
Length 10 m (33 ft)	Ordering No. 430CP-99LS
Length 20 m (66 ft)	Ordering No. 430CP-99LL
Length 50 m (164 ft)	Ordering No. 430CP-99LQ

Connection cable: pneumatic box - valve	
Length 5 m (16 ft)	Ordering No. 430CV-99LE
Length 20 m (66 ft)	Ordering No. 430CV-99LL
(thereof 2 m (6 ft) bakeable to 300°C)	

Set of compressed air lines: pneumatic box - valve	
Length 5 m (16 ft)	Ordering No. 430LV-99LE
Length 20 m (66 ft)	Ordering No. 430LV-99LL
(bakeable to 300°C)	

## 7 Options and accessories

### 7.1 Options

#### 7.1.1. Actuator

Compressed air reservoir

#### 7.1.2 Valve

Customer specified flanges

#### 7.1.3 Controller VP-6

Power failure option

Ordering No. 72356

### 7.2 Accessories (see VAT catalogue)

#### 7.2.1 Valve

Bake-out jackets for bake-out temperatures up to max. 300°C

Bake-out Control - Series 84

Valve Fittings - Series 33

#### 7.2.2 Controller VP-6

Mounting frame  
for mounting 1 to 4 controllers VP-6 into ■ 19" rack

Ordering No. 72488

Blank plate for mounting frame, width ¼ of 19"

Ordering No. 72489

Controller VP-6, 220V 50/60Hz, without power failure option

Ordering No. 430VP-12NL

Controller VP-6, 110V 50/60Hz, without power failure option

Ordering No. 430VP-11NL

Controller VP-6, 220V 50/60Hz, with power failure option

Ordering No. 430VP-12PL

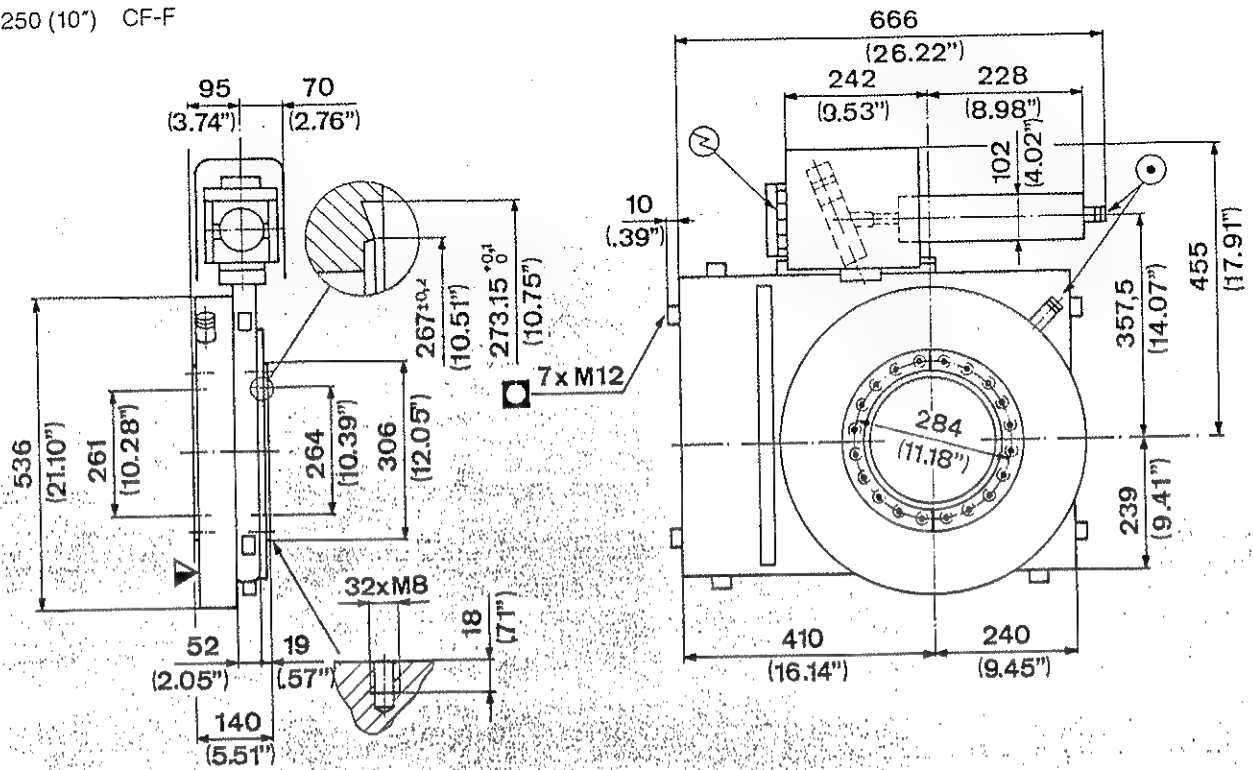
Controller VP-6, 110V 50/60Hz, with power failure option

Ordering No. 430VP-11PL

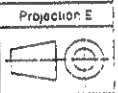
Pneumatic box 43

Ordering No. 430PB-99NN

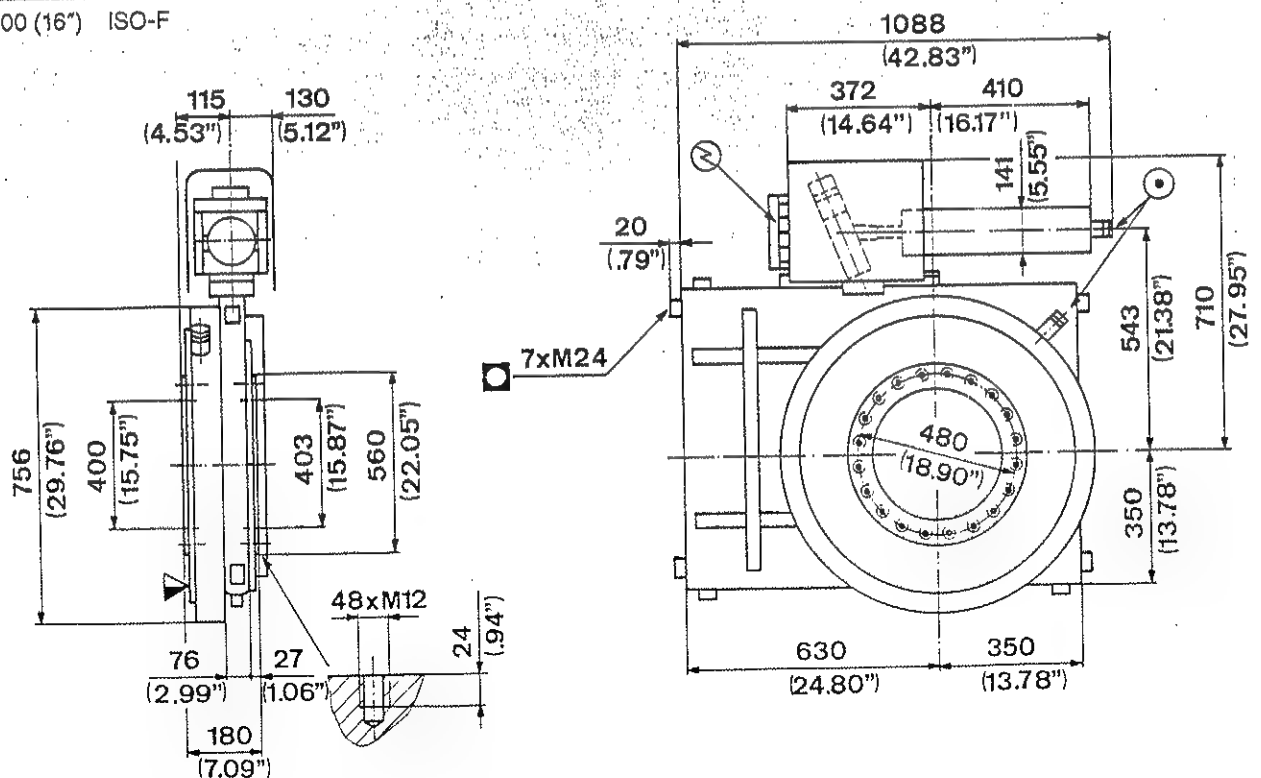
DN 250 (10") CF-F



▽ seat side    ⊗ electrical connection    ⊙ comp. air connection (1/8" NPT for USA)



DN 400 (16") ISO-F







AT Vakuumventile AG  
CH-9469 Haag, Schweiz  
Tel (085) 70161 Tlx 855162 Fax (085) 74830

# Prüfvorschrift und -protokoll Inspection Procedure and Certificate Procédé de contrôle et procès-verbal de réception

gemäss / according to / selon **DIN 50049-2.3**

Pneumatik-Steuerung  
Pneumatic control  
Contrôle pneumatique

Reihe 43  
Series 43  
Série 43

VP-6



Interface / Option

Logik  
logic  
logique



Power Failure Option  
Option "coupure de courant"



Software-Version  
Software version  
Version software

VP-6

X.00

Netzspannung  
Mains voltage  
Tension d'alimentation

220

V 50/60 Hz

Bestell-Nr.  
Ordering No.  
Code

81143-R1

Fabrikations-Nr.  
Fabrication No.  
No. de fabrication

F43-69072-13

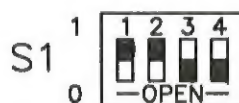
Schalterstellungen / Settings of switches / positions des commutateurs:

Masterboard



Interface

Logik  
logic  
logique



Baugruppentest  
Test of subassemblies  
Test des sous-ensembles



Burn-In  
Burn-In  
Déverminage



Funktionstest  
Final test  
Essai de fonctionnement



Sauberheitskontrolle  
Cleanliness verified  
Propreté vérifiée



Produkt entspricht interner Bestell-Nr.  
Product is in accordance with the internal ordering No.  
Le produit est conforme au no. de commande interne

81143-R1 . . . . .



Systemprüfung mit Ventil  
System test with valve  
Test du système avec vanne

Reihe  
Series  
Série



DN



Fabr.-Nr.  
Fabr. No.  
No. de fabr.

F



Bemerkungen / comments / remarques

Name / name / nom	VAT Prüffeld / test lab / salle d'essai	
Datum / date / date	Büchel	
Visum / signature / signature	26.10.93	
	AB	

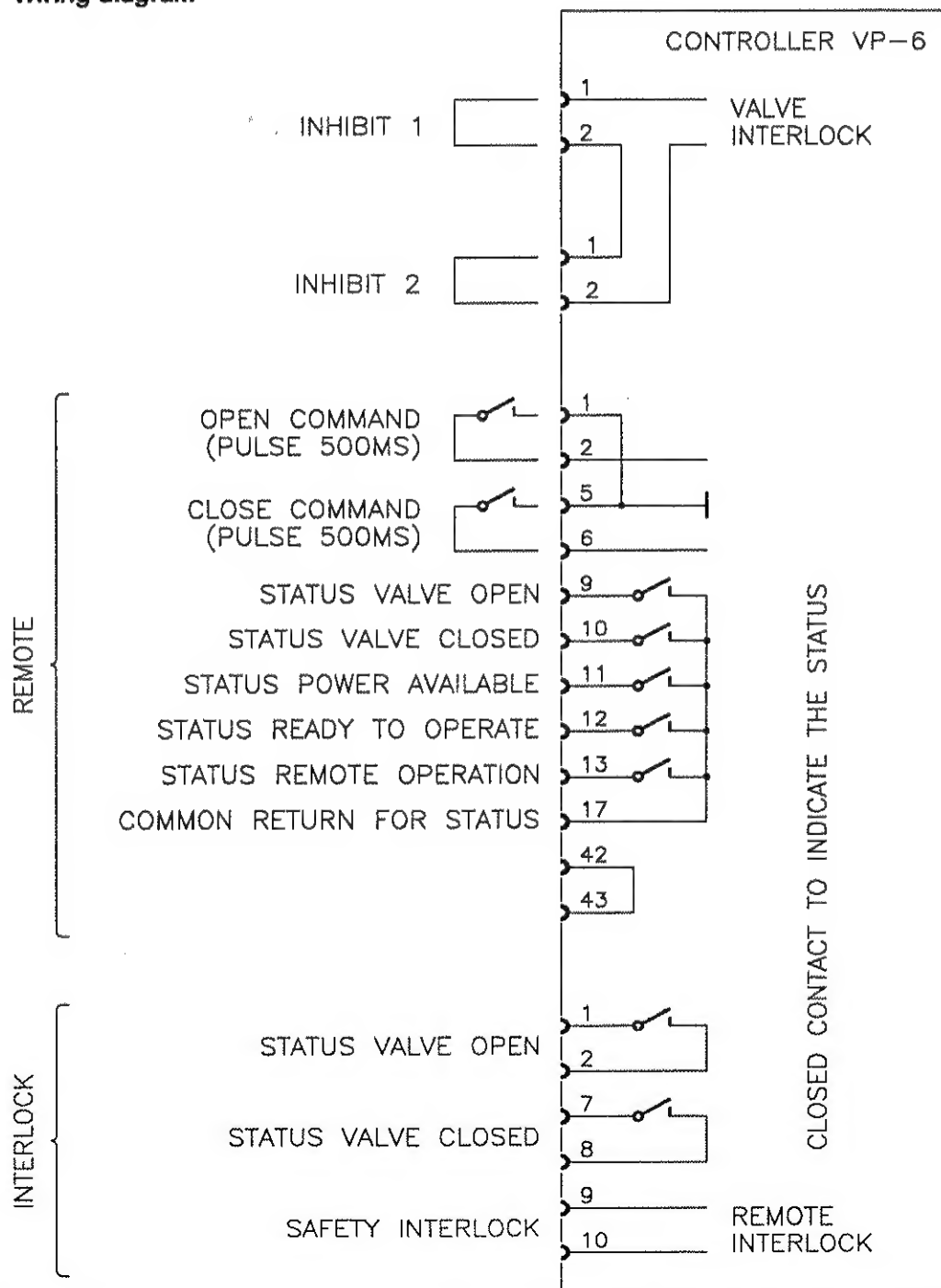


**CERN design, EPROM «VP-6 X.00»****2.2.1.2 Connection: controller - pneumatic box**

See enclosed diagram «pneumatic box» No. 79192

**2.2.1.3 Connection: pneumatic box - valve**


See enclosed diagram «pneumatic box» No. 79192

**3.2.2 Wiring diagram**

### 3.3.2 REMOTE Interlock

The valve closes in the event of an interruption of the remote interlock loop. The valve can only be opened when the loop is closed.

If the old VAT series 43 controller is replaced by the new one VP-6X, the switches S1 and S2 have to be set as follows:

S1:	1	2	3	4	5	6	7	8
								
	represent the nominal diameter of the valve see manual page 14				0	0	0	0

S2:	1	2	3	4	5	6	7	8
	1	1	0	1	0	1	0	0

